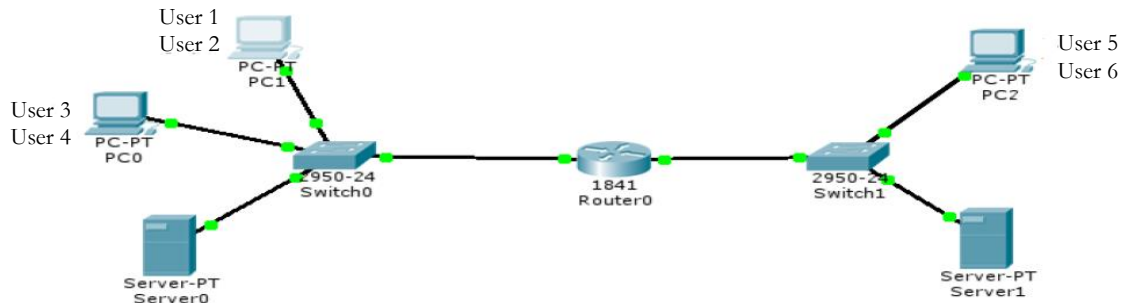## Tutorial No. 3: TCP/IP Model and Network Interconnection Devices

Exercise 01: Transmission and Encapsulation of TCP/IP Data

Given the following network:

1. Draw the layers of the TCP/IP model at PC0, Router0, and Server1.

2. Draw the path followed (through the TCP/IP model layers) by a message sent from PC0 to Server1 passing through Router0.

3. Provide the PDU format at each layer of the TCP/IP model in the following cases:
   a. User 1 sends their photo via Facebook (port: 80) to User 5.
   b. User 5 replies with 'Thank you' to User 1.
   c. User 4 downloads a file from Server1.

During the download performed by User 4, the connection was interrupted, and upon reconnecting, the user noticed that the download resumed exactly at the point where the connection was cut.

4. Which layer of the TCP/IP model is responsible for this operation? Why?"

Exercise 2: **Reminder**

1. Define the following terms, concepts, and/or devices:
   a. Serial/Parallel Communication
   b. Simplex, Half Duplex, and Full Duplex Communication
   c. Asynchronous/Synchronous Communication
   d. A transceiver
   e. A modem

Exercise 3: **Network Interconnection Devices**

Given the network given in the next page.

1. Recall the role of each network interconnection device in the diagram.

2. What are the OSI model layers and the TCP/IP model layers that exist in each device?

3. What type of address is handled by each device?

4. How many collision domains are there in the diagram? Why?

5. How many broadcast domains are there in the diagram? Why?

6. Explain the operation of the hub, repeater, Wi-Fi access point, bridge, switch, and router in the following cases:

   a. When Machine PC3 wants to communicate with Machine PC1
   b. When Machine PC7 wants to communicate with Machine PC6
   c. When Machine Smartphone0 wants to communicate with the internet

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